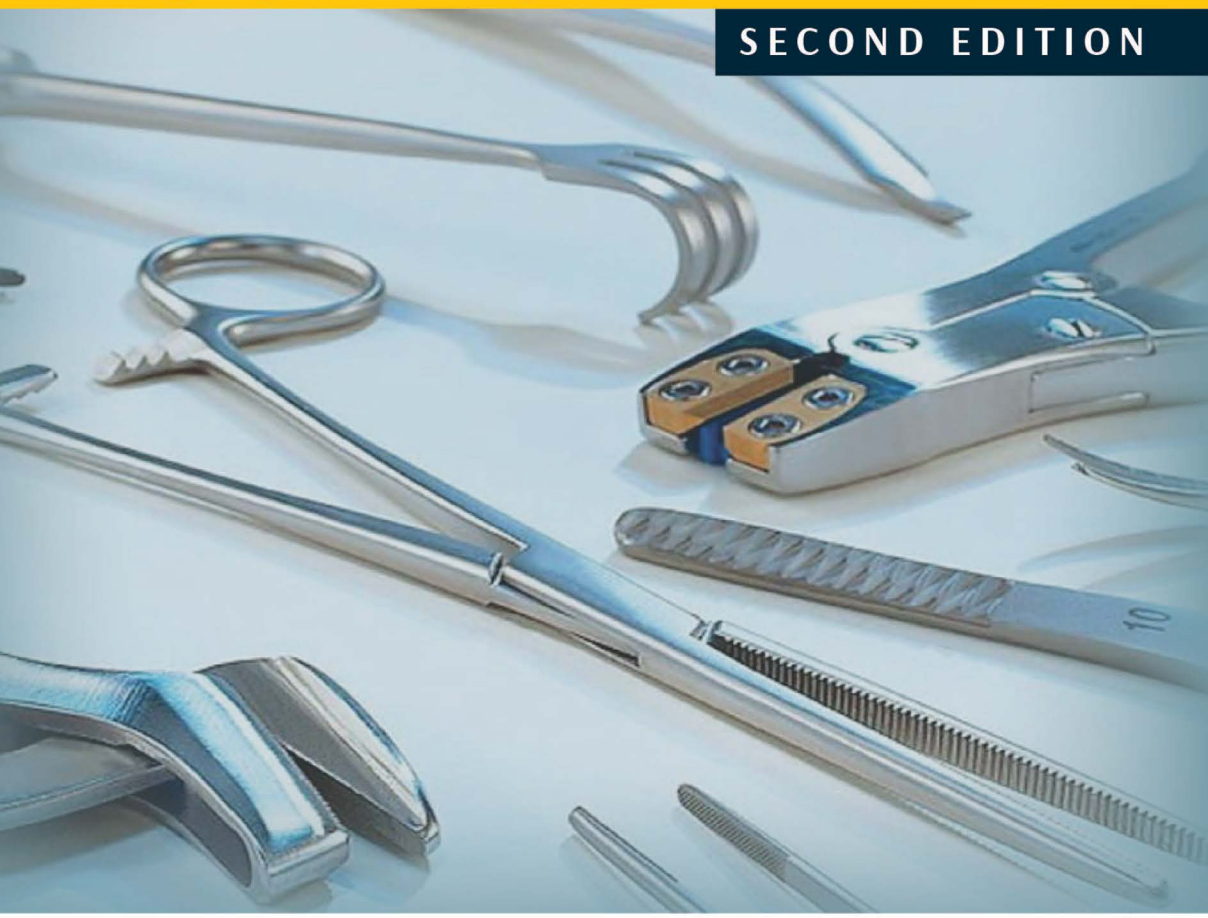
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Systematic Approach to Describe Instruments & Operative Procedures in Surgery, Orthopedics & Anesthesia

SECOND EDITION



Vinod Pusdekar

Forewords
Jagadish B Hedawoo
Varsha Sagdeo

JAYPEE

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Section

1

Sterilization, Types and Parts of a Surgical Instrument

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Section Outline

1. Sterilization of the Instruments
2. Various Types of Instruments in Common Surgical Practice
3. Parts of a Typical Surgical Instrument

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CHAPTER

1 Sterilization of the Instruments

Sterilization is the process of destroying life of all microorganisms causing infection (bacteria, viruses, fungi including bacterial spores).

Disinfection means killing all the microorganisms (infectious agents, except spores) outside the body, by exposing them directly to the chemical or physical agents.

Commonly employed methods for sterilization are **steam sterilization (autoclaving), boiling, chemical and gas sterilization.**

Steam sterilization: Steam sterilization is one of the most common forms of sterilization in general practice. All reusable metal instruments are sterilized by autoclaving at a temperature of 121° C, at 15 pounds per square inch (Ib/sq) pressure for 30–40 minutes and rubber articles like gloves, catheters, rubber drains for 15 minutes, after the desired temperature and pressure is achieved. If sharp instruments have to be autoclaved, their sharp ends must be well padded and covered with cotton pads to preserve their sharpness, as they lose their sharpness by repeated autoclaving. It is cheap alternative and effective too. Before sterilization, all the instruments, tubing, and cords should be wrapped doubly in a cloth to prevent contact with the hot metallic container which is then placed in the autoclave.

Boiling: Metal instruments can be sterilized by boiling them for half an hour (30 minutes) which kills all the bacteria and its spores. Boiling of the instrument should be continued for half an hour after water achieves a temperature of 100° C. But boiling is not suitable for sharp instruments as they lose their sharpness by repeated boiling. It also leads to crust formation over the instruments.

Chemical sterilization (High level disinfection): Sharp instruments like scissors, osteotomes, needles, etc. are sterilized by keeping them dipped in chemicals like lysol or cidex (2% glutarldehyde solution) for a minimum of 4–24 hours (10 hours) for their proper sterilization. Fiberoptic instruments like light cords, laparoscope, cystoscope, arthroscope are sterilized by immersing them in cidex. Other chemical agents used are peracetic acid and 6% stabilized

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hydrogen peroxide. Formaldehyde also can be used. But its use for sterilizing instruments and other items is not recommended nowadays.

Direct flaming: In case of urgency, when an instrument has fallen down from the operation table and is urgently required for the ongoing surgical procedure, it can be sterilized by direct flaming. The instrument is kept in a bowl and rectified spirit is poured over it and then it is flamed. Direct flaming achieves a temperature of 1400°C to make the instrument sterile.

Gas sterilization: Gas used for gas sterilization is ethylene oxide. It is suitable for all disposable instruments, insulated hand instruments and tubings. Gas sterilization with ethylene oxide causes no damage to instruments, and it is non-corrosive to optics, but it is costly. Fiberoptic instruments like laparoscope, cystoscope, arthroscope can be sterilized by keeping them in a formalin vaporizer chamber for at least 1 hour, in which formalin tablets are kept, which releases the formaldehyde gas. Chamber should be completely closed and airtight.

Note: Students can easily remember the first 4 methods of sterilization by remembering mnemonic ABCD (A: Autoclaving, B: Boiling, C: Chemical sterilization, D: Direct flaming).

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CHAPTER

2 Various Types of Instruments in Common Surgical Practice

Instruments in surgical practice, which may be of general surgery, orthopedics, ENT, ophthalmology or obstetrics and gynecology, can be broadly divided into following categories:

- Cutting instruments like scissors, surgical blades, etc.
- Holding instruments like swab holding forceps, tissue holding forceps, needle holder, etc.
- Retractors like Deaver's retractor, right angled retractor, Morris retractor, etc.
- Dissecting instruments like dissecting forceps, Lahey's forceps, etc.
- Clamps are used to clamp the blood vessels like Bulldog vascular clamp or to occlude the hollow organs of gastrointestinal tract like Doyen's gastrointestinal clamp, Payr's crushing clamp, etc.

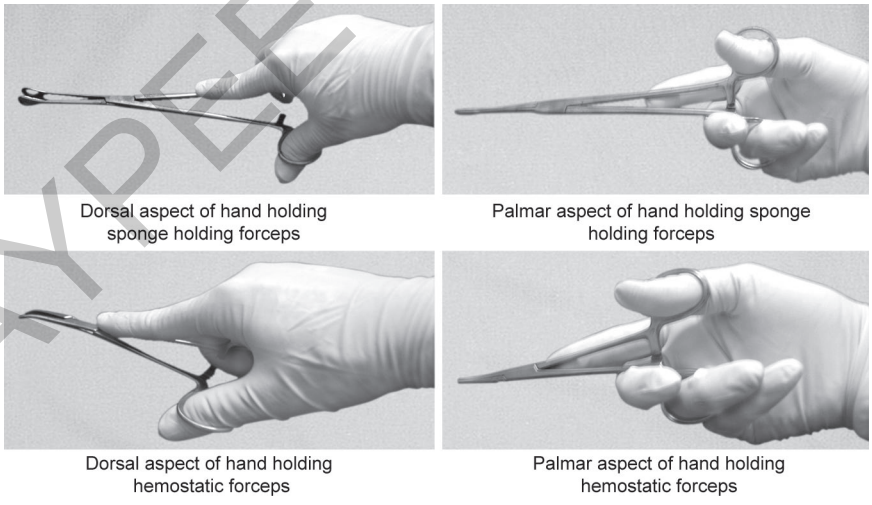


Fig. 1: Right hand holding a typical surgical instrument.

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How to hold a surgical instrument having finger bows, while using it or working with it?

Insert thumb in one of the finger bows and ring finger into the another one, middle finger rests on the catch, while the index finger has to be kept over the length of the shaft, tip of which directed towards the tip of the blades, while working with most of the instruments commonly used in surgical practice (Fig. 1).

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CHAPTER

3 Parts of a Typical Surgical Instrument

A typical long surgical instrument has the following parts (Fig. 1):
Finger bows: Two finger bows (rings) for holding the instrument properly (Commonly the thumb and the ring finger has to be put in the finger bows, while working with most of the surgical instruments).

Shaft: A pair of shaft or handle of the instrument, provides necessary length to the instrument (from catch to the joint).

Catch: A catch or ratchet when locked, the blades are closed and remain closed till the catch is released, making the instrument self-holding for the tissue held between its blades. Catch is meant for tight holding of the tissue held in between its blades without slipping. The instrument can be locked at its 1st, 2nd, 3rd or 4th catch, depending on the purpose of holding the tissue. In some instruments, it may not be present like scissors, sinus forceps, etc. where free movements of the blades are required.

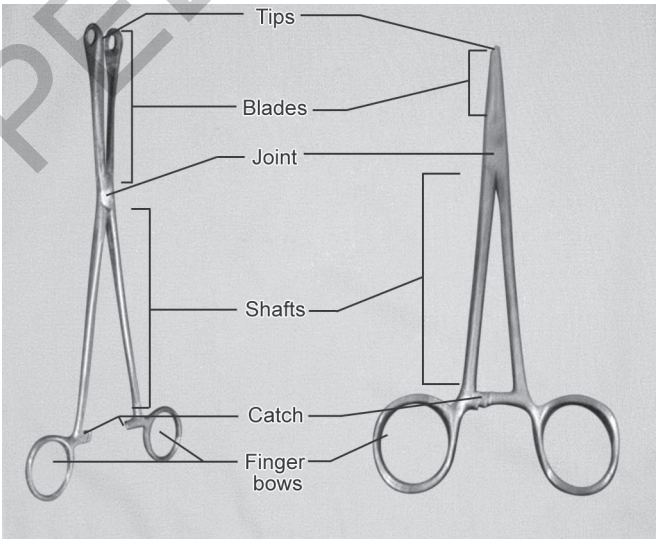


Fig. 1: Parts of a typical long surgical instrument.

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Joint or shank: The two parts of the shaft and blades are kept attached by a joint. This joint may be either a box type or pivot type. In box joint, there is a slot in one shaft and the other shaft is passed through this slot (like in hemostatic forceps). In pivot joint, the two shafts are attached with each other at one point by a screw (like in scissors).

Blades: A pair of blades constitutes the terminal part of the instrument (from the joint to the tip of the instrument). The blades are of different varieties and designed as per the use of the instrument.

Tip of the instrument: Terminal part of the blades, which may be sharp or blunt, depending on the purpose of the instrument for which it is commonly used.

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Systematic Approach to
Describe Instruments & Operative Procedures in
Surgery, Orthopedics and Anesthesia

This book is of great significance for the final year MBBS and postgraduate students of general surgery, orthopedics and anesthesia from the point of view of their examination preparation as it provides the basic knowledge of the questions routinely asked in practical table viva examinations. It provides simple, comprehensive, condensed and pointwise information with illustrative diagrams wherever required. A comprehensive description of the instruments used in general surgery, orthopedics and anesthesia along with their photographs is a prominent feature of this book. Important major and minor general surgical procedures and commonly performed bedside procedures are described in a step-by-step approach. Some of the neglected, but important commonly-asked topics such as different types of surgical suture materials, surgical needles, perurethral, catheters, tubes, drains, intravenous fluids and intravenous cannulas are also covered in this book. The second edition also includes chapters on recent advances in general surgery such as laparoscopic surgery and robotic surgery. Common surgical emergencies presenting to the emergency room are also discussed in the second edition.

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